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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,152	02/11/2004	Arlie R. Conner	59373US002	3103
32692 7590 02/01/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER CARTER, WILLIAM JOSEPH	
			ART UNIT	PAPER NUMBER
			2875	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/01/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/776,152	<b>Applicant(s)</b> CONNER, ARLIE R.	
	<b>Examiner</b> William J. Carter	<b>Art Unit</b> 2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 November 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4,5,7,9-12,14-16,19,20,23,26,29 and 34-64 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7,9,11,12,14-16,19,20,23,26,34-40,42-56 and 58-64 is/are rejected.
- 7) ☒ Claim(s) 10,41 and 57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5, 7, 9, 11, 12, 14, 16, 19, 20, 23, 26, 34-40, 42-45, 47-56, 58-62, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Handschy (6,038,005) in view of Magarill (5,625,738).

With respect to claim 1, Handschy discloses an illumination system having a plurality of light source modules (Fig. 4, item 52), an illumination target (item 62), and a system of optical elements (items 60, and 48) disposed between the plurality of light source modules and the illumination target. The system of optical elements images the emitting surfaces of the light source modules onto the illumination target creating a plurality of images of the emitting surfaces (Fig. 4 and Col. 10, lines 36-45). Handschy does not explicitly teach the target is a light tunnel having an entrance. Magarill, also drawn to illumination systems, teaches a target is a light tunnel (2) having an entrance (Fig. 1). It would have been obvious to one of ordinary skill in the art, at the time of the

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invention, to use the light tunnel of Magarill in the illumination system of Handschy, in order to produce light at the exit end of the tunnel which is substantially uniform in power distribution (Abstract).

As for claim 2, Handschy further discloses the images of the emitting surfaces are substantially superimposed to form an illumination patch, and the illumination patch substantially fills the illumination target (Fig. 4).

As for claim 4, Handschy further discloses the shape of at least one of the emitting surface substantially matches the shape of the illumination target (Col. 10, lines 1-21).

As for claim 5, Handschy further discloses the shape of the illumination target is substantially square (Col. 10, lines 1-18).

As for claims 7 and 9, Handschy further teaches the shape of at least one of the light emitting surfaces is substantially square (Fig. 7A, item 68), the shape of the illumination target being substantially square, and the system of optical elements is configured so that the shape of the illumination patch substantially matches the shape of the illumination target (Col. 10, lines 1-21).

As for claim 11, Handschy further discloses the images of the emitting surfaces are closely packed (Fig. 18A-C and Col. 18, lines 35-38) thus forming an illumination patch that substantially fills the illuminating target.

As for claim 12, Handschy further discloses that the images of the emitting surfaces overlap thus forming an illumination patch that substantially fills the illumination target (Col. 2, lines 51-63).

As for claim 14, Handschy further discloses the light source modules (Fig. 4, item 52) and the system of optical elements (item 60) are configured to form a plurality of light channels aimed substantially into the illumination target (Col. 10, lines 45-51).

As for claim 16, Handschy further discloses the light source modules (Fig. 3, item 52) are disposed substantially coplanar with each other and the system of optical elements (items 34 and 48) comprises means for aiming at least some of the light from each light source module substantially toward the illumination target.

As for claim 19, Handschy further discloses each light source module having a plurality of emitting surfaces of different colors disposed next to each other (Col. 10, lines 45-53).

As for claim 20, Handschy further discloses that each light source module comprises a first light emitting surface of a first color (Fig. 18B, item 164), a second light emitting surface of a second color (item 166) and a third light emitting surface a third color (item 168).

As for claim 23, Handschy further discloses the system of optical elements having polarizing beam splitting mirrors (item 48, column 7, line 6). Magarill teaches beam splitting mirrors that are dichroic (64, 66, and 68). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the dichroic mirrors of Magarill in the illumination system of Handschy, in order to create three highly uniform beams of light, one for each primary color (column 9, lines 33-36).

As for claim 26, Handschy further discloses the first, second and third colors are primary colors (164, 166, and 168).

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As for claim 34, Handschy further disclose the illumination target (LCD, spatial light modulator, item 46) is an image forming devices.

As for claim 35, Handschy further discloses the images of the emitting surfaces (Fig. 18A, item 152) are substantially superimposed to form an illumination patch that is substantially fills the illumination target (item 46).

As for claim 36, Handschy further discloses the illumination patch overfills the illumination target (Col. 19, lines 3-10).

As for claim 37, Handschy further discloses the shape of at least one of the emitting surface substantially matches the shape of the illumination target (Col. 10, lines 1-21).

As for claim 38, Handschy further discloses the shape of the illumination target is substantially square (Col. 10, lines 1-18).

As for claims 39 and 40, Handschy further teaches the shape of at least one of the light emitting surfaces is substantially square (Fig. 7A, item 68), the shape of the illumination target being substantially square, and the system of optical elements is configured so that the shape of the illumination patch substantially matches the shape of the illumination target (Col. 10, lines 1-21).

As for claim 42, Handschy further discloses the images of the emitting surfaces are closely packed (Fig. 18A-C and Col. 18, lines 35-38) thus forming an illumination patch that substantially fills the illuminating target.

As for claim 43, Handschy further discloses that the images of the emitting surfaces overlap thus forming an illumination patch that substantially fills the illumination target (Col. 2, lines 51-63).

As for claim 44, Handschy further discloses that the illumination target is an active matrix liquid crystal image generator, which is a LCD having a plurality of pixels configured in a matrix to generate image.

As for claim 45, Handschy further discloses the light source modules (Fig. 4, item 52) and the system of optical elements (item 60) are configured to form a plurality of light channels aimed substantially into the illumination target (Col. 10, lines 45-51).

As for claim 47, Handschy further discloses the light source modules (Fig. 3, item 52) are disposed substantially coplanar with each other and the system of optical elements (items 34 and 48) comprises means for aiming at least some of the light from each light source module substantially toward the illumination target.

As for claim 48, Handschy further discloses an illumination system having a plurality of light source modules (Fig. 4, item 52), each light source module having a plurality of emitting surfaces of different colors disposed next to each other (Col. 10, lines 45-53).

As for claim 49, Handschy further discloses that each light source module comprises a first light emitting surface of a first color (Fig. 18B, item 164), a second light emitting surface of a second color (item 166) and a third light emitting surface a third color (item 168).

As for claim 50, Handschy further discloses the illumination target having the first, second, and third color zones, and the system of optical elements images the first emitting surface onto the first color zone, the second emitting surface onto the second color zone, and the third emitting surface onto the third color zone (Fig. 15B).

As for claim 51, Handschy further discloses the first, second and third colors are primary colors (164, 166, and 168).

As for claim 52, Handschy further discloses the system of optical elements having polarizing beam splitting mirrors (item 48, column 7, line 6). Magarill teaches beam splitting mirrors that are dichroic (64, 66, and 68). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the dichroic mirrors of Magarill in the illumination system of Handschy, in order to create three highly uniform beams of light, one for each primary color (column 9, lines 33-36).

As for claim 53, Handschy further discloses the system of optical elements having a lens array (Fig. 4, item 60 and Col. 10, lines 35-36) disposed between the plurality of light source modules (item 52) and the illumination target (item 46) and teaches a lens (36) that is a lenticular lens. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the lenticular lens in the lens array, in order to provide focus the light produced by the array (Fig. 4).

As for claim 54, Handschy further teaches the system (Fig. 4) decreasing etendue degradation (by focusing the light beams on target 62, Handschy is inherently decreasing etendue).



As for claims 55 and 56, Handschy and Magarill teach all of the claimed elements, as discussed above, as well as Magarill further teaches forming an illumination patch (D in Fig. 1a), the illumination patch substantially filling the entrance (N in Fig. 1a) of the light tunnel (2). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the illumination patch and entrance of a light tunnel of Magarill in the illumination system of Handschy, in order to maximize efficiency of the system (column 7, lines 1-3). Upon combination of Handschy and Magarill, the emitting surface (emitting surface of 48) of Handschy would substantially match the shape of the entrance (N in Fig. 1a) of the light tunnel (2) of Magarill.

As for claim 58, Handschy further teaches the images of the emitting surfaces are closed packed (images from light sources 164, 166, and 168 are closely packed to form an illumination patch at 162).

As for claim 59, Handschy further teaches the images of the emitting surfaces overlap (Figs. 18A and 18C, the images start as separate images (Fig. 18C) and are overlapped to form one image (Fig. 18A) at 162) thus forming an illumination patch (at 162).

As for claim 61, Handschy teaches a light source module (152) comprising a plurality of emitting surfaces (Fig. 18C) of different colors (164, 166, and 168) disposed next to each other (Fig. 18B) and teaches a plurality of light source modules (52 in Fig. 4). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the light source modules of Fig. 18 in the illumination system of Fig. 4,

in order to create substantially uniform white light throughout the target area (column 18, lines 41-45).

As for claims 60, 62, and 64, Handschy and Magarill teach all of the claimed elements, as discussed above, as well as Handschy teaches, in the embodiment shown in Fig. 14B, light source modules (116) and the system of optical elements (118, 120, 124, and 36) are configured to form a plurality of channels (right and left) aimed substantially into the target (128); and the light source modules (116) are disposed substantially coplanar (Fig. 14B) with each other and the system of optical elements comprises means (118, 120, 124, and 36) for aiming at least some light from each light source module substantially toward the illumination target (128). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the channels of Fig. 14B in the embodiments shown in Figs. 4 and 18, in order to make the illumination system miniature (column 16, lines 21-24).

Claims 15, 46, 57, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Handschy and Magarill as applied to claim 45 above, and further in view of Anderson (5,997,150).

With respect to claims 15, 46, 57, and 63, Handschy and Magarill teach all of the claimed elements, as disclosed above, as well as Handschy teaches the light source modules disposed on a flat glass substrate (Fig. 7A, item 68) but does not teach the light source modules disposed tangentially to and along a spherical surface. Anderson shows LED's are mounted tangentially to and along a spherical surface in figure 6 and figure 7, in order to reduce chromatic beam distortion from LEDs at the edges of the

array. The light from each LED intersects and focuses at a common focal point F (Col. 6, lines 12-25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the LEDs such that the light from each LED intersects and focuses at a common focal point as Anderson's illumination system in the illumination system of Handschy so that chromatic beam distortion from LEDs at the edges of the array can be reduced from Handschy's illumination system (column 6, lines 21-25).

#### ***Allowable Subject Matter***

Claims 10, 41, and 57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 29 is allowed. The prior art does not teach or suggest a non-radially symmetrical aperture, along with the other limiting factor of the independent claims.

#### ***Response to Arguments***

Applicant's arguments filed 13 November 2006 have been fully considered but they are not persuasive. With respect to claim 1, an illumination target of Handschy was intended to be identified as item 62 not item 46. The claim's do not require Handschy to teaches a system that can both homogenize light and minimize the angular spread, because these functions are not explicitly claimed, although Figs. 14B and 18A-18C do

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teach this function. Claim 16 does not require light channels, and as described above Handschy shows in Fig. 4B light being aimed substantially at an illumination target.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Carter whose telephone number is (571)272-0959. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra L. O'Shea can be reached on (571)272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

wjc  
1/24/07

  
ALI ALAVI  
PRIMARY EXAMINER